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Searching for signatures of self-aggregation in less idealized atmospheres

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Radiative convective equilibrium (RCE) simulations have now widely demonstrated the ability of convection to organize on its own, a process called self-aggregation. Given the stark idealization of such simulations, in particular due to the use of homogeneous boundary conditions and the absence of large-scale forcing, the relevance of self-aggregation for the real world remains under debate. Here, we first introduce large-scale meridional SST gradients, as used in aquaplanet simulations, to study the interactions between SST gradients and the self-aggregation of convection. We find that the self-aggregation of convection still occurs in those simulations. It leads to a zonal contraction of the convergence line initially spin up by the meridional SST gradient, the more so, the weaker the SST gradient is. We then use reanalysis data to check this finding. As a second step, we use the reanalysis data to check another prediction from RCE simulations, i.e. the fact that a more organized Intertropical Convergence Zone is associated with drier subtropics.

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